D) AMENDMENTS TO THE DRAWINGS

None.

E) REMARKS

This Response is filed in response to the Office Action dated March 30, 2005.

Entry of this amendment is requested to clarify the claims for purposes of appeal. Upon entry of this response, claims 1-22 will be pending in this Application.

In the outstanding Office Action, the Examiner rejected claims 1-9 and 16-18 under obviousness-type double patenting; rejected claims 1-6 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. (U.S. Patent No. 5,545,437) in view of Klabunde (U.S. Patent No. 4,877,647) and further in view of Kirk-Othmer and Rigney et al. (U.S. Patent No. 6,455,167); rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. (U.S. Patent No. 5,545,437) in view of Klabunde (U.S. Patent No. 4,877,647) and further in view of Kirk-Othmer and Rigney et al. (U.S. Patent No. 6,455,167) as applied to claim 6, and further in view of Vakil (U.S. Patent No. 5,407,705); rejected claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. (U.S. Patent No. 5,545,437) in view of Klabunde (U.S. Patent No. 4,877,647) and further in view of Kirk-Othmer and Rigney et al. (U.S. Patent No. 6,455,167) as applied to claim 6, and further in view of Eppler; rejected claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. (U.S. Patent No. 5,545,437) in view of Klabunde (U.S. Patent No. 4,877,647) and further in view of Kirk-Othmer and Rigney et al. (U.S. Patent No. 6,455,167) as applied to claim 1, and further in view of Tecle (U.S. Patent No. 5,922,403); rejected claims 11-13 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. (U.S. Patent No. 5,545,437) in view of Klabunde (U.S. Patent No. 4,877,647) and further in view of Kirk-Othmer and Rigney et al. (U.S. Patent No. 6,455,167) as applied to claim 1, and further in view of Akechi (JP Publication 60081892A); rejected claims 14-15 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. (U.S. Patent No. 5,545,437) in view of Klabunde (U.S. Patent No. 4,877,647) and further in view of Kirk-Othmer and Rigney et al. (U.S. Patent No. 6,455,167) as applied to claim 1, and further in view of Skoog et al. (U.S. Patent No. 6,720,034) and rejected claims 16-22 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. (U.S. Patent No. 5,545,437) in view of Klabunde (U.S. Patent No. 4,877,647) and further in view of Kirk-Othmer, Rigney et al. (U.S. Patent No. 6,455,167), Eppler, Tecle

(U.S. Patent No. 5,922,403), Akechi (JP Publication 60081892A, and further in view of Demaray (U.S. Patent No. 4,676,994).

Double Patenting

The Examiner has rejected claims 1-5 over claims 2, 4-6 and 7 of U.S. Patent No. 6,720,034, claims 1-9 and 16-18 over claims 1-16 of U.S. Patent No. 6,720,034 in view of U.S. Patent No. 6,342,278, and claims 1-5 over claims 2, 6, 7, 9 and 10 of copending Application No. 10/726,361 under the judicially created doctrine of obviousness-type double patenting.

The Examiner states

> Claims 1-5 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2,4-6 and 7 of U.S. Patent No. 6720034. Although the conflicting claims are not identical, they are not patentably distinct from each other because after the application of a ceramic barrier coating in claim 7 of the existing patent the component of the gas turbine engine inherently has an outer ceramic surface.
>
> Claims 1-9 and 16-18 rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of U.S. Patent No. 6720034 by Skoog et al. in view of US Patent 6342278 by Rigney et al. Claims 1-16 of U. S. Patent No. 6720034 teach all the limitations set forth by claims 1-9 and 16-18 of the present invention, except teaching of a component of a gas turbine engine having an outer ceramic surface. However, US Patent 6342278 by Rigney et al teaches of application of a protective ceramic coating to a superalloy turbine blade or a ceramic substrate. Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Skoog et al. to use an outer ceramic layer of a turbine blade suggested by Rigney et al. to provide a desirable heat reflective coating because Skoog teaches applying a thermal insulating coating to a superalloy turbine blade and Rigney teaches ceramic substrates benefit from an insulating coating. Such a modification to claims 1-16 of US Patent 6720034 would have been obvious to one of ordinary skill in the art and thus claims 1-9 and 16-18 of the present invention are obvious variants to claims 1-16 of US Patent 6720034.
>
> Claims 1-5 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 2, 6, 7, 9, and 10 of copending Application No. 10726361. Although the conflicting claims are not identical, they are not patentably distinct from each other because after the application of a ceramic barrier coating in claim 9 of the copending application patent the component of the gas turbine engine inherently has an outer ceramic surface.

In response thereto, Applicants are submitting a terminal disclaimer with this response. Therefore, claims 1-9 and 16-18 are believed to overcome the obviousness-type double patenting rejection and are therefore believed to be allowable.

Rejection under 35 U.S.C. 103

A. Claims 1-6 and 8

The Examiner rejected claims 1-6 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. (U.S. Patent No. 5,545,437) hereafter referred to as "Nagaraj et al." in view of Klabunde (U.S. Patent No. 4,877,647) hereinafter referred to as "Klabunde" and further in view of Kirk-Othmer and Rigney et al. (U.S. Patent No. 6,455,167) hereafter referred to as "Rigney et al."

Specifically, the Examiner stated that

> Nagaraj et al. teaches a method of applying a heat reflecting on a nickel-based superalloy component of a gas turbine engine by applying a ceramic thermal barrier coating onto the substrate by plasma spraying and then applying the heat reflecting layer of gold or platinum on the thermal barrier coating (Col. 3, line 26-Col. 4, line 24). It is the examiners position that the ceramic thermal barrier coating dries prior to application of the heat reflective coating. Nagaraj et al. does not teach the claimed method of applying the heat-reflecting layer. However, Nagaraj et al. teaches that the heat-reflecting layer can be applied by any conventional deposition technique (Col. 3, lines 49-57). Klabunde teaches forming a reflective metal layer, such as a gold or platinum layer, on a substrate by forming a dispersion of metal particles and organic solvent carrier, applying the dispersion to a substrate and then heating/firing to form the metal layer, where the dispersion can be applied by spraying (Col. 3, lines 35-65; Col. 6, lines 30-54).
>
> Nagaraj et al. in view of Klabunde does not teach the spraying is an air assisted spraying technique. However, using air to atomize and project a spray for coating a gas turbine engines is well established in the art, as shown by Kirk-Othmer. (see page 672, Table 1, page 688, Table 2), and hence would have been an obvious method of spraying the heat-reflective coating because of the expectation of successfully forming the reflective layer.
>
> It would have been obvious to one of ordinary skill at the time of the invention was made to apply the heat reflective layer of Nagaraj using conventional spraying as taught by Klabunde and specifically the conventional air-assisted spraying as disclosed by Kirk-Othmer because of the expectation of successfully applying the heat reflective layer on a gas turbine engine.
>
> Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer do

not teach the gas turbine engine having an outer ceramic layer. However, Nagaraj et al teaches a gas turbine engine part, while preferably formed from a nickel-based superalloy, can also be other suitable high temperature materials (Column 3, lines 29-31). Rigney et at teaching of a thermal barrier coating for a gas turbine engine discloses that deposition of a thermal barrier coating is advantageous to insulate a superalloy and/or ceramic substrate from high temperature.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer to use the ceramic substrate as suggested by Rigney et alto provide a desirable insulting coating because Rigney et al. teaches both a superalloy and ceramic coating at known in the art to be subjected to high temperature environments.

Nagaraj et al. in view of Kiabunde and further in view of Kirk-Othmer and Rigney et al. does not teach the claimed amount of reflective coating mixture and thermal barrier coating applied to the substrate. However, it is the examiners position that the amount of these coatings applied to the turbine component are known result effective variables, as not enough of these coatings applied to the component would not provide the desired heat reflectance and thermal barrier properties, and too much would not offer additional benefits of increased heat reflectance and thermal properties.

Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to determine an optimal coating amount for the heat reflective layer and the thermal barrier layer, in the process of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at., through routine experimentation, to provide the desired heat reflecting and thermal barrier properties for the turbine component.

Applicants respectfully traverse the rejection of claims 1-6 and 8 under 35 U.S.C. § 103(a).

The following principle of law applies to all Section 103 rejections. MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the applied prior art references clearly do not arguably teach some limitations of the claims.

Claim 1, as amended, recites a method of applying a heat-rejection coating, comprising the steps of: supplying a component of a gas turbine engine having an outer ceramic surface; providing a reflective-coating mixture, wherein the reflective-coating mixture comprises a

metallic pigment and an evaporable carrier; applying the mixture to the outer ceramic surface by a method selected from the group consisting of air-assisted spraying, airless spraying, brushing, and decal transfer, each of the group being capable of being applied at ambient room temperature and not requiring the component to be disposed inside a chamber having a pressure level less than ambient pressure level; and firing the component having the reflective-coating mixture thereon to form a reflective coating on the ceramic component. (Emphasis added).

Nagaraj et al., as understood, is directed to metal articles and protective layers that are applied to a metal article. Nagaraj et al. has no teaching of a method for applying a reflective-coating mixture. Nagaraj et al. teaches that his mixtures "can be readily deposited" (col. 3, line 60) and mentions "conventional deposition techniques" (col. 3, line 56), but gives no teaching of a specific approach.

Applicants note that the Examiner concedes Applicants' above characterization of Nagaraj as it was not disputed in the "Response to Arguments" in the present Office Action. Applicants go further. Applicants assert that Nagaraj et al. teaches away from the present invention. First, the present invention recites only applying a reflective coating mixture, not both a reflective coating mixture and thermal barrier coating. Second, since the reflective coating mixture is not applied by previously identified methods as recited in claim 1, the amount applied may differ from previous application techniques. Further, the only deposition methods taught in Nagaraj for applying the barrier layer are chemical and physical vapor deposition (CVD and PVD), electroplating and plasma spray techniques. See col. 4, lines 15-18. These processes are specifically not within the scope of the present invention as claimed because they require complex deposition apparatus, and/or special chambers, and limit the size of the articles that may be coated. See paragraphs [0014] and [0037]. This is significant as to how Nagaraj et al. would be considered by one having skill in the art trying to deposit a reflective coat onto a ceramic outer surface of a gas turbine component. While the present invention lacks a thermal barrier coat, since the thermal barrier coat must be applied prior to the applying the reflective coat, which thermal barrier coat being deposited only by methods which are specifically outside the scope of the present invention, due to the special apparatus and chambers required, the

subsequent reflective coat being applied by unnamed "conventional deposition techniques," such techniques would logically be the same apparatus and chambers already available to apply the thermal barrier coat. Since the present invention recites specific deposition techniques, none of which are disclosed or suggested by Nagaraj et al., with none of the deposition techniques taught by Nagaraj et al. being available to one practicing the present invention, due to the limitations of the Nagaraj et al. techniques, Nagaraj et al. necessarily teaches away from the present invention.

Klabunde, as understood, teaches "spraying or dripping" (col. 6, line 33), but has no teaching of any of the recited techniques. Klabunde also has no teaching of the use of his approach with a "reflective-coating mixture" as claimed. Applicant does not know whether palladium, platinum, and/or gold colloidal metal dispersions as taught by Klabunde will yield a "reflective-coating mixture" as claimed, and Klabunde has no teaching that they do.

As to the Kirk-Othmer publication, Applicants respectfully traverse the Examiner's contention that the Kirk-Othmer publication teaches coating a gas turbine engine. The Kirk-Othmer publication, as understood, does appear to identify air-assisted and other atomizer spraying techniques and identify some of their commercial uses. However, Applicants would like to point out that the context of the Kirk-Othmer publication, at least with respect to gas turbine engines, is clearly not that of the present invention. That is, for gas turbines, the Kirk-Othmer publication states "[f]or example, there is a growing concern over pollutant emissions from aircraft and automotive engines that utilize atomizers." See page 670. In other words, the spraying techniques cited in this publication with respect to atomizers appears directed to the internal workings of the gas turbine, i.e., the injection of fuel inside the engine for combustion, not applying a coating to the surface of a gas turbine engine. In addition, this publication fails to teach that heat-reflective coatings can be applied by spraying techniques.

Therefore, the Kirk-Othmer publication cannot form the basis for concluding that spraying a heat-reflective coating onto a gas turbine engine is obvious due to the expectation of successfully forming the reflective layer as the Examiner suggests. Further, due to the different context of use of the spray as disclosed in the Kirk-Othmer publication, the Kirk-Othmer publication is not combinable with the other references in an attempt to yield Applicant's invention.

In view of the above, the Examiner, in his Response to Arguments on page 3 states:

> The applicant argues against the Kirk-Othmer publication stating that the context of the Kirk-Othmer reference is directed toward internal workings of gas turbine engine and fails to teach heat-reflective coatings can be applied by spraying techniques. The examiner respectfully disagrees. The Kirk-Othmer publication, as a whole, is directed to known and conventional spraying techniques and discloses, on page 688 in Table 2, air-atomizing sprays is a known method of spraying coatings. Therefore, the Kirk-Othmer publication, reasonably suggests to one of ordinary skill in the art to utilize air-assisted spraying to coat a substrate. Therefore, it would have been obvious to one of ordinary skill at the time of the invention was made to apply the heat reflective layer of Nagaraj using conventional spraying as taught by Klabunde and specifically the conventional air-assisted spraying as disclosed by Kirk-Othmer because of the expectation of successfully applying the heat reflective layer coating on substrate.

First of all, the Examiner has mischaracterized Applicants' response to the Examiner's first Office Action (page 5) stating:

> Nagaraj et al. in view of Klabunde does not teach the spraying is an air assisted spraying technique. However, using air to atomize and project a spray for coating a gas turbine engine is well established in the art, as shown by Kirk-Othmer (see page 672, Table 1, page 688, Table 2), and hence would have been an obvious method of spraying the heat-reflective coating because of the expectation of successfully forming the reflective layer.

Applicants had pointed out, as previously stated, that the Kirk-Othmer publication in fact does not show that it is well established in the art to use air to atomize and project a spray for coating a gas turbine engine, only that certain types of atomizers are used by internal components gas turbines that have to do with the operation of fuel injection, not spray coatings. Applicants note the Examiner's clarification of Kirk-Othmer, i.e., that the Kirk-Othmer publication, as a whole, is directed to known and conventional spraying techniques, disclosing air-atomizing sprays as a known method of spraying coatings, noting again that the reference to gas turbine engines refer to internal components of gas turbines. However, Applicants assert that the purpose of Kirk-Othmer is not to oxidize/combust the coating material. Moreover, Applicants strongly disagree with the Examiner's conclusion. Even if Kirk-Othmer reasonably suggests that air-assisted spraying is available for the applications identified therein, it does not disclose or

suggest that any methods for coatings applied to the surface of a gas turbine engine. That is, a reflective coating mixture as recited in independent claim 1.

Moreover, Applicants strongly disagree that even if Kirk-Othmer taught or suggested that air-assisted spraying can be applied to the surface of a gas turbine engine, which it doesn't, that it would have been obvious to one of ordinary skill at the time of the invention was made to apply the heat reflective layer of Nagaraj et al. using conventional spraying as taught by Klabunde and specifically the conventional air-assisted spraying as disclosed by Kirk-Othmer because of the expectation of successfully applying the heat reflective layer coating on substrate. First of all, as discussed above, Nagaraj et al., does not disclose or suggest any methods for applying a reflective coating, and discloses methods of applying the diffusion layer that are specifically outside the scope of the present invention, thereby teaching away from the present invention as discussed previously. Moreover, Klabunde has no teaching of any of the recited techniques. Klabunde also has no teaching of the use of his approach with a "reflective-coating mixture" as claimed. Applicant does not know whether palladium, platinum, and/or gold colloidal metal dispersions as taught by Klabunde will yield a "reflective-coating mixture" as claimed, and Klabunde has no teaching that they do. Finally, Kirk-Othmer does not teach or suggest applying an air assisted coating, or any coating for that matter, that is applied to the outside surface of a gas turbine engine component. Therefore, even if these references were to be combined, they would not yield Applicants' invention.

Rigney et al., as understood, is directed to coatings on superalloy substrates such as a diffusion layer applied to a substrate followed by subsequent alumina layer, followed by a ceramic topcoat. Although the ceramic topcoat may be classified as a thermal barrier coat to allow performance at higher temperatures (see col. 5, lines 21-23), a thermal barrier coat is not a reflective coat as specifically recited in the present invention. Even the Examiner concedes, in the Response to Arguments, page 3, that "the ceramic coating of Rigney is a thermal barrier coating rather tha[e]n a reflective coating", and that "Rigney is only utilized [] as a showing that ceramic gas turbine engines are known in the art to be subject to high temperature environments." Applicants disagree, since a reference teaching use of the thermal barrier coating does not suggest that a reflective coat can also be used. Therefore, Rigney et al. cannot be

combined with the other references to teach providing a desired reflective-coating mixture to form a reflective coating on the ceramic component of the present invention.

Furthermore, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination." See Manual of Patent Examining Procedure, 8th Edition (MPEP), Section 2143.01.

The Examiner is reminded that "[i]f the proposed modification or combination of the prior art would change the principle or operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *See* MPEP, Section 2143.01.

> To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

See Manual of Patent Examining Procedure, 8th Edition (MPEP), Section 2143.03.

Nagaraj et al. teaches application techniques that cannot be used to practice the claimed invention, and which are specifically identified above.

Therefore, for the reasons given above, independent claim 1, as amended, is believed to be distinguishable from Nagaraj et al., Klabunde, Kirk-Othmer and Rigney et al. and therefore are neither anticipated nor rendered obvious by Nagaraj et al., Klabunde, Kirk-Othmer and Rigney et al.

Dependent claims 2-6 and 8 are believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claims 2-6 and 8 recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claims 1-6 and 8 are neither anticipated nor rendered obvious by Nagaraj et al., Klabunde, Kirk-Othmer and Rigney et al. and are therefore allowable.

B. Claim 7

The Examiner rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claim 6, and further in view of Vakil (U.S. Patent No. 5,407,705) hereinafter "Vakil."

Specifically, the Examiner stated that

> Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. does not teach the claimed thermal barrier layer material containing lanthanum or cerium. Vakil teaches a nickel-based superalloy gas turbine engine component having a ceramic thermal barrier coating, where the coating can include cerium (Col. 6, lines 1-25).
>
> It would have been obvious to one skilled in the art at the time the invention was made to use the ceramic thermal barrier coating material of Vakil, including the cerium component, in the process of Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. with the expectation of providing suitable thermal barrier properties, as shown by Vakil for nickel-based superalloy gas turbine engine components.

Applicants respectfully traverse the rejection of claim 7 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj et al., Klabunde, Kirk-Othmer and Rigney et al. are equally applicable here.

Claim 7 recites the method of claim 6, wherein the step of applying the ceramic barrier coating further includes applying a coating comprising a ceramic material selected from the group consisting of lanthanum and cerium.

Dependent claim 7 is believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claim 7 recites further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 7 is neither anticipated nor rendered obvious by Nagaraj et al., Klabunde, Kirk-Othmer, Rigney et al. and Vakil and is therefore allowable.

C. Claim 9

The Examiner rejected claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claim 6, and further in view of Eppler.

Specifically, the Examiner stated that

> Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. does not teach that the ceramic thermal barrier coating is applied by air assisted spraying. However, Eppler teaches breaking down a ceramic into fine particles and air assisted spraying them onto a substrate (Page 955, Col. 3).
>
> Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. to use the air assisted spray technique suggested by Eppler to provide a desirable ceramic coating on a substrate Eppler teaches air-assisted spraying is known in the art to provide ceramic coatings onto a substrate.

Applicants respectfully traverse the rejection of claim 9 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj et al., Klabunde, Kirk-Othmer and Rigney et al. are equally applicable here.

Eppler, as understood, is directed to spraying ceramic coatings. However, in the passage cited by the Examiner in Eppler, "[s]praying requires a gun, a container or feed mechanism, an impelling agent, and a properly designed hood or booth maintained under negative pressure (Ref 16)." See page 955, col. 3. (Emphasis added). Stated another way, spraying according to Eppler requires a special enclosure to perform. In contrast, the present invention in paragraph [0015], which refers to airless or air-assisted spraying for applying reflective coating and ceramic barrier coating, discloses that

> Most of these other application techniques are limited as to the size of the articles that may be readily coated, because they require special chambers or other types of application apparatus. Airless or air-assisted spraying which are typically ambient room temperature processes, on the other hand, are not limited by these considerations, and therefore may be readily used on a wide variety of sizes and shapes of components.

Therefore, "airless or air assisted spraying" according to the present invention is distinctly different than the "negative pressure" taught by Eppler so that Eppler teaches away from the present invention. This limitation is incorporated into claim 1, wherein, in the step "applying the mixture to the outer ceramic surface by a method selected from the group consisting of air-assisted spraying, airless spraying, brushing, and decal transfer, each of the group being capable of being applied at ambient room temperature and not requiring the

component to be disposed inside a chamber having a pressure level less than ambient pressure level."

Dependent claim 9 is believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claim 9 recites further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 9 is neither anticipated nor rendered obvious by Nagaraj et al., Klabunde, Kirk-Othmer, Rigney et al. and Eppler and is therefore allowable.

D. Claim 10

The Examiner rejected claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claim 6, and further in view of Tecle (U.S. Patent No. 5,922,403) hereinafter "Tecle."

Specifically, the Examiner stated that

> Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. does not teach of providing a reflective-coating mixture with a noble metal encapsulator. Tecle teaches of a method for forming a palladium, silver, gold or platinum in an organic carrier (Col. 3, lines 25-35). Tecle discloses utilizing an encapsulant material to limit the required amount of solvent (Col. 4, lines 59-67). Tecle utilizes a metallic colloidal solution with fluxing agents to coat ceramics, metals, and ceramic/metal composites (Column 7, lines 10-31).
>
> Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. to use a solution containing a metal encapsulant and fluxing agent as taught by Tecle to provide a desirable metallic coating because Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. teaches using a metallic pigment in an organic solvent for coating a surface and Tecle teaches a metal encapsulant reduces the large amount of solvent required when coating a ceramic or metal substrate and fluxing agents are provide enhanced adherence of a coating to a substrate.

Applicants respectfully traverse the rejection of claim 10 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj et al., Klabunde, Kirk-Othmer and Rigney et al. are equally applicable here.

Tecle, as understood, is directed to preparing formulations having ultrafine particles that can be placed in a solvent that encapsulates the solvent as applied. Tecle fails to disclose a technique for applying the solvent to an article substrate, and there is question whether the Tecle

solvent can be applied by at least some of the recited application techniques due to the decreased amount of solvent contained in the Tecle suspension.

Dependent claim 10 is believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claim 10 recites further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 10 is neither anticipated nor rendered obvious by Nagaraj et al., Klabunde, Kirk-Othmer, Rigney et al. and Tecle and is therefore allowable.

E. Claims 11-13

The Examiner rejected claims 11-13 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claim 1, and further in view of Akechi (Japanese Publication No. JP 60081892A) hereinafter "Akechi."

Specifically, the Examiner stated that

> Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. does not teach a reflective coating mixture containing a glass or ceramic comprising up to 25 wt% of the reflective mixture. Akechi teaches of using glass frit and noble metal dispersion in an organic vehicle to from a coating (Abstract). Akechi discloses using 1-3 wt % glass frit and 37-59 wt % noble metal powder in a 40-60 wt % organic vehicle (abstract). The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made if the overlapping portion of the range as disclosed by the reference were selected because overlapping ranges have been held to be prima facie case of obviousness. See In re Wortheim 191 USPQ 90.
>
> Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Kiabunde and further in view of Kirk-Othmer and Rigney et al. to use the glass fritlnobte metal in an organic vehicle taught by Akechi to provide a desirable noble metal coating which experiences no deformation when coating.

The Examiner also stated in the Response to Arguments, page 5

> The applicant has argued against the Akechi reference stating that it teaches a thick paste and not therefore cannot be applied by the coating techniques of the present invention. The examiner only utilizes Akechi as a showing that it is known in the art to provide a glass filler in a noble metal/organic carrier dispersion. In response to applicant's argument that Akechi is nonanalogous art, it has been held that a prior art reference must either be in the

> field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker,* 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, both the prior art and the present claims are directed to applying a metal/organic coating onto a substrate.

Applicants respectfully traverse the rejection of claims 11-13 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj et al., Klabunde, Kirk-Othmer and Rigney et al. are equally applicable here.

Akechi, as understood, based on the English translation of the Abstract, is directed to a thick film paste of predetermined percentages by weight of precious metal powder, glass frit and an organic vehicle for preparing a thermal print head. Applicants note that by virtue of the Akechi material being presented in the form of a thick paste, the only identified application technique is printing, which technique is not included as any of the recited application techniques of the present invention. Additionally, Akechi is directed to thermal printing heads, which are not remotely related to reflective coatings on gas turbine engines, and is therefore non-analogous art. Therefore, Akechi is not properly combinable with the other references. As such, Applicants continues to respectfully disagree with the Examiner's position. If the rejection is to be sustained, Applicants request the Examiner provide a complete translation of Akechi.

Dependent claims 11-13 are believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claims 11-13 recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 11-13 is neither anticipated nor rendered obvious by Nagaraj et al., Klabunde, Kirk-Othmer, Rigney et al. and Akechi and are therefore allowable.

F. Claims 14-15

The Examiner rejected claims 14-15 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claim 1, and further in view of Skoog (U.S. Patent No. 6,720,034) hereinafter "Skoog."

The above discussion of Nagaraj et al., Klabunde, Kirk-Othmer and Rigney et al. are equally applicable here.

Dependent claims 14-15 are believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claims 14-15 recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 14-15 are neither anticipated nor rendered obvious by Nagaraj et al., Klabunde, Kirk-Othmer, Rigney et al. and Skoog and are therefore allowable.

G. Claims 16-22

The Examiner rejected claims 16-22 under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., Eppler, Tecle, Akechi and further in view of Demaray (U.S. Patent No. 4,676,994) hereinafter "Demaray."

Specifically, the Examiner stated that

> Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer, Rigney et at., Eppler, Tecle, and Akechi teaches all the limitations of these claims as discussed above, except pre-treating the component surface prior to coating. Demaray teaches pretreating a component prior to application of a thermal barrier layer, in order to achieve a desired surface roughness (Col. 2, line 49-Col. 3, line 5). One skilled in the art would have recognized that such polishing/roughening is conventionally used for enhancing the adhesion of subsequently applied coatings to a substrate.
>
> Therefore, it would have been obvious to one skilled in the art to pretreat the nickel-based superalloy component of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., Eppley, Tecle, and Akechi, prior to applying the coatings, in order to enhance the bonding of the coatings to the metal components, since polishing of superalloys prior to coating to enhance coating adhesion is disclosed by Demaray.

Applicants respectfully traverse the rejection of claims 16-22 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj et al., Klabunde, Kirk-Othmer and Rigney et al. is equally applicable here.

Demaray, as understood, is directed to applying ceramic coats to article substrates. While Applicants concur that the cited portion of Demaray (col.2, line 49 through col. 3, line 5) teaches applying a ceramic coat to a substrate, Applicants also note that the cited portion is directed to a metal substrate, not a ceramic coated substrate, which is the claimed substrate in claim 16. Additionally, the base material in Demaray is polished, in contrast to grit blasting as disclosed in

the present invention (see Figure 6). Finally, the ceramic material in Demaray is applied by techniques other than air-assisted spraying. See col. 3, line 55 through col. 5, line 30. Further, Applicants note that grit blasting is only employed as a pretreatment if the substrate is metal. (See paragraph [0042]). When a ceramic or ceramic coated article is provided, however, grit blasting is not performed, and a bond coat is applied, followed by a subsequent thermal barrier coat and then a subsequent smooth coat. In other words, the component pre-treating of the present invention is not taught or suggested in Demaray, and in fact, Demaray teaches away from the present invention.

Dependent claims 16-22 are believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claims 16-22 recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 16-22 are neither anticipated nor rendered obvious by Nagaraj et al., Klabunde, Kirk-Othmer, Rigney et al., Eppler, Tecle, Akechi and Demaray and are therefore allowable.

CONCLUSION

Claims 1-22 as amended are distinguishable over the prior art of record and are in condition for allowance.

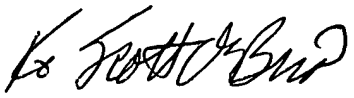
Applicants request the entry of the present amendment and the withdrawal of the rejection of claims 1-22. Alternatively, Applicants request entry of the amendment to clarify the claims on appeal. Based on the amendments to the claims, Applicants further request allowance of claims 1-22, and issuance of the application as amended. A timely and favorable action is earnestly solicited.

Should the Examiner have any questions with respect to any matter now of record, the Examiner is requested to contact the undersigned at the phone number listed below.

The Commissioner is authorized to charge any fees and credit any overpayments to the Deposit Account 50-1059.

Respectfully submitted,

McNEES, WALLACE & NURICK

By 

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